

REMARKS

Re-examination and allowance of the present application is respectfully requested.

Applicants respectfully traverse the Examiner's 35 U.S.C. § 103 rejection of claims 1, 2, 4, 6, 7, 9, 11-13, 15 and 18 as being obvious over U.S. Patent No. 5,305,353 to WEERACKODY in view of U.S. Patent No. 6,538,608 to MURAMOTO et al.

According to a feature of the present invention, the phase difference between individual modulation signals transmitted from a first linear polarization antenna element and a second linear polarization antenna element is controlled to be either 0 degrees or 180 degrees in accordance with transmission data. By such an arrangement, the transmission is performed in a predetermined polarization plane and in another different polarization plane. A signal transmitted in the predetermined polarization plane will have a first (e.g., stronger) electric field strength when the signal matches a receiving polarization plane of the receiving apparatus. A signal transmitted in the different polarization plane does not match the receiving polarization plane of the receiving apparatus and will thus have a second (e.g., weaker) electric field strength. That is, the transmitting apparatus transmits signals in polarization planes in accordance with the transmission data, such that the receiving apparatus detects the electric field strength in accordance with the transmission data.

Moreover, data having the first (i.e., stronger) electric field strength is subjected to a data determination on an as-is basis. On the other hand, when the data has the second (i.e., weaker) electric field strength, the data having the first (i.e., stronger) electric field strength will be inverted before being subjected to the data determination. As a result, the receiving apparatus is able to perform a high quality data reception using a single antenna.

Applicants submit that WEERACKODY fails to disclose/suggest at least the above feature. WEERACKODY discloses a time diversity technique that transmits the same data at varying times from a plurality of antennas, and changes the weights of the amplitudes and phases of the transmitted signals. However, Applicants submit that even if plural antennas are provided and the phases are switched therebetween by either 0 degrees or 180 degrees, the same data is merely repeatedly transmitted. Accordingly, Applicants submit that WEERACKODY differs in configuration and in effect from Applicants invention, and fails to disclose and/or suggest Applicants' feature of phase difference between individual modulation signals being transmitted from to a first linear polarization antenna element and a second linear polarization antenna element, and being controlled to be either 0 degrees or 180 degrees in accordance with transmission data. By such an arrangement, the transmission is performed in a predetermined polarization plane and in another different polarization plane.

Further, Applicants submit that MURAMOTO et al. fails to disclose/suggest that which is lacking from WEERACKODY. Applicants submit that MURAMOTO et al. merely discloses a polarization diversity technique in which a whip antenna is used to receive vertical polarized waves and a built-in antenna is used to receive horizontal polarized waves.

Accordingly, Applicants submit that even if one attempted to combine the teachings of the two references in the manner submitted by the Examiner, one would fail to arrive at the instant invention, in which a phase difference between spread signals transmitted individually from the first and second linear polarization antenna elements are controlled to be either 0 degrees or 180 degrees.

According to an additional feature of the present invention, the phase difference between individual spread signals transmitted from the first linear polarization antenna element and the second linear polarization antenna element are controlled to be either 0 degrees or 180 degrees in accordance with a spreading code used in a spreading process. By such an arrangement, a transmission is performable in a predetermined polarization plane and in another different polarization plane.

Applicants submit that this additional feature of the instant invention is lacking from the combination of WEERACKODY and MURAMOTO et al. suggested by the Examiner.

According to a still further feature of the present invention, the first antenna element performs a transmission in a predetermined polarization plane and the second antenna element performs a transmission in a polarization plane that is perpendicular to the predetermined polarization plane. A destination of a modulation signal (e.g., spread modulation signal) is set to one of the two antenna elements. It is Applicants' contention that this feature is also neither disclosed nor suggested by either of the applied art of record, either individually or in the combination suggested by the Examiner.

According to a still further feature of the instant invention, a transmission is enabled in a predetermined polarization plane and in a polarization plane that is perpendicular to the predetermined polarization plane, in which the polarization plane is switched in accordance with the transmission data or a spreading code used in a spreading process. Applicants submit that this feature is also not disclosed or suggested by WEERACKODY and MURAMOTO et al., either individually or in combination.

Another feature of the present invention that Applicants submit is not taught or suggested by the prior art combination set forth by the Examiner resides in performing a data determination based on a magnitude of the electric field strength of a signal transmitted in a predetermined polarization plane, and a magnitude of the electric field strength of a signal transmitted in a polarization plane that differs from the predetermined polarization plane. According to this feature, when the transmitting apparatus transmits signals in polarization planes in accordance with transmission data, the receiving apparatus detects a difference between the polarization planes based upon the magnitude of the electric field strength. That is, for example, a signal received at the receiving apparatus in the predetermined polarization plane may have, for example, a first (i.e., stronger) electric field strength, while a signal transmitted in the different polarization plane may have, for example, a second (i.e., weaker) electric field strength. In the instant invention, the receiving apparatus detects the electric field strength based upon the transmission data. If, for example, the result of decoding the signal having the first (stronger) electric field strength is equal to "1", it is concluded that a result of decoding the signal having the second (weaker) electric field strength would be, for example, "0". Thus, it is possible to accurately perform a decoding operation in the instant invention even when signals are received with a weak electric field strength. In this regard, Applicants submit that WEERACKODY (see, for example, column 1, lines 24-26) merely discloses that the strength of the received signals vary between very small and moderately large values. However, Applicants submit that this reference fails to disclose (or even suggest) the accurate decoding, as described above. Furthermore, Applicants submit that MURAMOTO et al. merely discloses that a receiver receives a plurality of signals transmitted with different polarization planes, but does not disclose or suggest Applicants' decoding operation.

Accordingly, Applicants submit that the teachings of WEERACKODY and MURAMOTO et al. differ in configuration and in effect from the present invention, in which a data determination is performed based on the magnitude of the electric field strength of a signal transmitted in a predetermined polarization plane and the magnitude of the electric field strength of a signal transmitted in a different polarization plane from the predetermined polarization plane. Accordingly, Applicants submit that the presently claimed invention is distinguishable from the prior art combination set forth by the Examiner, and respectfully request withdrawal of the 35 U.S.C. § 103 rejection.

By the present response, Applicants cancel claims 1-13 and 15-18 and submit new claims 19-35 for the Examiner's consideration. New claim 19 is based upon canceled claim 1, but is amended to clarify that the phase controller controls a phase difference between modulated signals transmitted individually from the first and second linear polarization antenna elements. As discussed above, this feature is neither disclosed nor suggested by the prior art of record, either individually or in the combination suggested by the Examiner. Accordingly, Applicants submit that new claim 19, along with dependent claims 20-23 is allowable over the applied art of record.

New claim 24 is based upon previously pending claim 6, but is further amended to clarify that the phase controller controls a phase difference between individual spread signals transmitted from the first and second linear polarization antenna elements. As discussed above, this claim also employs a spreading code using a spreading process, which, as Applicants discussed above, is not disclosed or suggested by the applied references, either independently or in the combination suggested by the Examiner. Accordingly, Applicants submit that independent claim 24, along with dependent claims 25-28 are allowable over the prior art of record.

New independent claims 29, 30 and 31 correspond to previously pending claims 11, 12 and 13, respectively. These claims are amended to clarify that the antenna has a first antenna element that performs a transmission in a predetermined polarization plane, and a second antenna element that performs a transmission in a polarization plane that is perpendicular to the predetermined polarization plane. As discussed above, this feature is neither disclosed nor suggest by the applied art of record, either singularly or in combination. Accordingly, Applicants submit that new claims 29-31 are allowable over the applied art of record.

New independent claim 32 is based upon previously pending claim 18. However, claim 32 is amended to clarify that the antenna performs a transmission in a predetermined polarization plane, and a polarization plane that is perpendicular to the predetermined polarization plane, and that the polarizations are switched according to a spreading code.

New independent claim 33 is based upon previously pending claim 15. Claim 33 clarifies that the receiver receives a signal transmitted in a predetermined polarization plane and a second signal that is transmitted in a polarization plane that differs from the predetermined polarization plane, and further, that the determiner performs a data determination by associating a magnitude of the received electric field strength of the signal transmitted in the predetermined polarization plane and the received electric field strength of the second signal transmitted in the different polarization plane.

Applicants thank the Examiner for indicating that previously pending claims 3, 5, 8, 10, 16 and 17 contain allowable subject matter and that these claims would be allowable if they were amended to be placed into independent form. Applicants note that these claims correspond to currently pending claims 21, 23, 26, 28, 34 and 35, respectively. In view of the amendments to the

respective independent claims, Applicants submit that the independent claims are allowable over the applied art of record, and thus, it is not necessary to place the objected to claims into independent form. However, Applicants respectfully reserve the right to place these claims into independent form at a later time. The Examiner is respectfully requested to re-confirm the allowability of these dependent claims (e.g., claims 21, 23, 26, 28, 34 and 35), along with indicating the allowability of the currently amended independent claims.

Pursuant to M.P.E.P. § 714.13, Applicants contend that entry of the present amendment is appropriate because the proposed amended claims avoid the rejections set forth in the last Office Action, resulting in the application being placed in condition for allowance, or, alternatively, the revised claims place the application in better condition for purposes of appeal. Further, Applicants submit that the revised claims do not present any new issues that would require any further consideration or search by the Examiner; and the amendment does not present any additional claims without canceling a like number of pending claims. Accordingly, entry of the present amendment is respectfully requested.

SUMMARY AND CONCLUSION

In view of the fact that none of the art of record, whether considered alone or in combination, discloses or suggests the present invention as now defined by the pending claims, and in further view of the above amendments and remarks, reconsideration of the Examiner's action and allowance of the present application are respectfully requested and are believed to be appropriate.

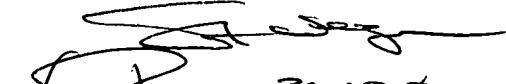
Any amendments to the claims which have been made in this amendment, and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered

to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Should an extension of time be necessary to maintain the pendency of this application, including any extension of time required to place the application in condition for allowance by an Examiner's Amendment, the Commissioner is hereby authorized to charge any additional fee to Deposit Account No. 19-0089.

If there should be any questions concerning this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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